



# Methods

# Calling Methods

```
turnRight();
```

```
move();          readInt("Int please! ");
```

```
println("hello world");
```

```
rect.getX();
```

```
drawRobotFace();
```

```
rect.setLocation(10, 20);
```

# Defining a Method

```
private void turnRight() {  
    turnLeft();  
    turnLeft();  
    turnLeft();  
}
```



# Anatomy of a method

```
public void run() {  
    double mid = average(5.0, 10.2);  
    println(mid);  
}
```

```
private double average(double a, double b) {  
    double sum = a + b;  
    return sum / 2;  
}
```

# Anatomy of a method

```
public void run() {  
    double mid = average(5.0, 10.2);  
    println(mid);  
}
```

Output expected

Input expected

```
private double average(double a, double b) {  
    double sum = a + b;  
    return sum / 2;  
}
```

# Anatomy of a method

```
public void run() {  
    double mid = average(5.0, 10.2);  
    println(mid);  
}
```

name

```
private double average(double a, double b) {  
    double sum = a + b;  
    return sum / 2;  
}
```

# Anatomy of a method

```
public void run() {  
    double mid = average(5.0, 10.2);  
    println(mid);  
}
```

```
private double average(double a, double b) {  
    double sum = a + b;  
    return sum / 2;  
}
```

body

# Anatomy of a method

```
public void run() {  
    double mid = average(5.0, 10.2);  
    println(mid);  
}
```

```
private double average(double a, double b) {  
    double sum = a + b;  
    return sum / 2; } return
```



# Anatomy of a method

```
public void run() {  
    double mid = average(5.0, 10.2);  
    println(mid);  
}
```

method "call"

```
private double average(double a, double b) {  
    double sum = a + b;  
    return sum / 2;  
}
```

# Void Example

```
private void printIntro() {  
    println("Welcome to class");  
    println("It's the best part of my day.");  
}
```

```
public void run() {  
    printIntro();  
}
```

# Example

```
private double metersToCm(double meters) {  
    return 100 * meters;  
}
```

```
public void run() {  
    println(metersToCm(5.2));  
}
```

# Parameter Example

```
private void printOpinion(int num) {  
    if(num == 5) {  
        println("I love 5!");  
    } else {  
        println("Whatever");  
    }  
}  
  
public void run() {  
    printOpinion(5);  
}
```

# Multiple Return

```
private String getMonthName(int i) {  
    if (i == 0) {  
        return "January";  
    }  
    if (i == 1) {  
        return "February";  
    }  
    ...  
    return "Unknown";  
}
```

# Defining a Method

```
visibility type nameOfMethod(parameters) {  
    statements  
}
```

- *visibility*: usually **private** or **public**
- *type*: type returned by method (e.g., **int**, **double**, *etc.*)
  - Can be **void** to indicate that nothing is returned
- *parameters*: information passed into method

```
private void run() {  
    double r = readPositive("Enter radius: ");  
    double area = getArea(r);  
    println(area);  
}
```

```
private double readPositive(String prompt) {  
    double value = readDouble(prompt);  
    while (value < 0) {  
        println("Invalid");  
        value = readDouble(prompt);  
    }  
    return value;  
}
```

```
private double getArea(double radius) {  
    return PI * radius * radius;  
}
```

```
private void run() {
```

```
    double r = readPositive("Enter radius: ");
```

```
    double area = getArea(r);
```

```
    println(area);
```

```
}
```



```
private void run() {  
    double r = readPositive("Enter radius: ");  
    double area = getArea(r);  
    println(area);  
}
```

```
private void run() {  
    double r = readPositive("Enter radius: ");  
    double area = getArea(r);  
    println(area);  
}
```

```
private void run() {
```

```
    private double readPositive(String prompt) {  
        double value = readDouble(prompt);  
        while (value < 0) {  
            println("Invalid");  
            value = readDouble(prompt);  
        }  
        return value;  
    }  
}
```

```
private void run() {
```

```
    private double readPositive(String prompt) {
```

```
        double value = readDouble(prompt);
```

```
        while (value < 0) {
```

```
            println("Invalid");
```

```
            value = readDouble(prompt);
```

```
        }
```

```
        return value;
```

```
    }
```

prompt

"Enter radius: "

```
private void run() {  
    private double readPositive(String prompt) {  
        double value = readDouble(prompt);  
        while (value < 0) {  
            println("Invalid");  
            value = readDouble(prompt);  
        }  
        return value;  
    }  
}
```

prompt

"Enter radius: "

value

-3

```
private void run() {  
    private double readPositive(String prompt) {  
        double value = readDouble(prompt);  
        while (value < 0) {  
            println("Invalid");  
            value = readDouble(prompt);  
        }  
        return value;  
    }  
}
```

prompt

"Enter radius: "

value

-3

```
private void run() {  
    private double readPositive(String prompt) {  
        double value = readDouble(prompt);  
        while (value < 0) {  
            println("Invalid");  
            value = readDouble(prompt);  
        }  
        return value;  
    }  
}
```

prompt

"Enter radius: "

value

-3

```
private void run() {  
    private double readPositive(String prompt) {  
        double value = readDouble(prompt);  
        while (value < 0) {  
            println("Invalid");  
            value = readDouble(prompt);  
        }  
        return value;  
    }  
}
```

prompt

"Enter radius: "

value

-3



```
private void run() {  
    private double readPositive(String prompt) {  
        double value = readDouble(prompt);  
        while (value < 0) {  
            println("Invalid");  
            value = readDouble(prompt);  
        }  
        return value;  
    }  
}
```

prompt

"Enter radius: "

value

42

```
private void run() {  
    private double readPositive(String prompt) {  
        double value = readDouble(prompt);  
        while (value < 0) {  
            println("Invalid");  
            value = readDouble(prompt);  
        }  
        return value;  
    }  
}
```

prompt

"Enter radius: "

value

42

```
private void run() {  
    private double readPositive(String prompt) {  
        double value = readDouble(prompt);  
        while (value < 0) {  
            println("Invalid");  
            value = readDouble(prompt);  
        }  
        return value;  
    }  
}
```

prompt

"Enter radius: "

value

42

```
private void run() {  
    private double readPositive(String prompt) {  
        double value = readDouble(prompt);  
        while (value < 0) {  
            println("Invalid");  
            value = readDouble(prompt);  
        }  
        return value;  
    }  
}
```

prompt

"Enter radius: "

value

42

```
private void run() {  
    double r = readPositive("Enter radius: ");  
    double area = getArea(r);  
    println(area);  
}
```

42

```
private void run() {
```

```
    double r = readPositive("Enter radius: ");
```

```
    double area = getArea(r);
```

```
    println(area);
```

```
}
```

r

42

```
private void run() {  
    double r = readPositive("Enter radius: ");  
    double area = getArea(r);  
    println(area);  
}
```

r

42

```
private void run() {  
    double r = readPositive("Enter radius: ");  
    double area = getArea(r);  
    println(area);  
}
```

r

42



```
private void run() {
```

```
    private double getArea(double radius) {
```

```
        return PI * radius * radius;
```

```
    }
```

```
private void run() {
```

```
private double getArea(double radius) {
```

```
    return PI * radius * radius;
```

```
}
```

radius

42

```
private void run() {  
    private double getArea(double radius) {  
        return PI * radius * radius;  
    }  
}
```

radius

42

```
private void run() {  
    private double getArea(double radius) {  
        return PI * radius * radius;  
    }  
    5538.96
```

radius

42

```
private void run() {  
    double r = readPositive("Enter radius: ");  
    double area = getArea(r);  
    println(area);  
}
```

5538.96

r

42

```
private void run() {  
    double r = readPositive("Enter radius: ");  
    double area = getArea(r);  
    println(area);  
}
```

5538.96

r

42

```
private void run() {  
    double r = readPositive("Enter radius: ");  
    double area = getArea(r);  
    println(area);  
}
```

5538.96

r 42

area 5538.96

```
private void run() {  
    double r = readPositive("Enter radius: ");  
    double area = getArea(r);  
    println(area);  
}
```

r

42

area

5538.96



```
private void run() {  
    double r = readPositive("Enter radius: ");  
    double area = getArea(r);  
    println(area);  
}
```

r

42

area

5538.96

# Bad Times With Methods

// NOTE: This program is buggy!!

```
private void addFive(int x) {  
    x += 5;  
}
```

```
public void run() {  
    int x = 3;  
    addFive(x);  
    println("x = " + x);  
}
```

# Good Times With Methods

// NOTE: This program is **feeling just fine...**

```
private int addFive(int x) {  
    x += 5;  
    return x;  
}
```

```
public void run() {  
    int x = 3;  
    x = addFive(x);  
    println("x = " + x);  
}
```

More Examples

# Changed Name

```
private void run() {  
    int num = 5;  
    cow(num) ;  
}
```

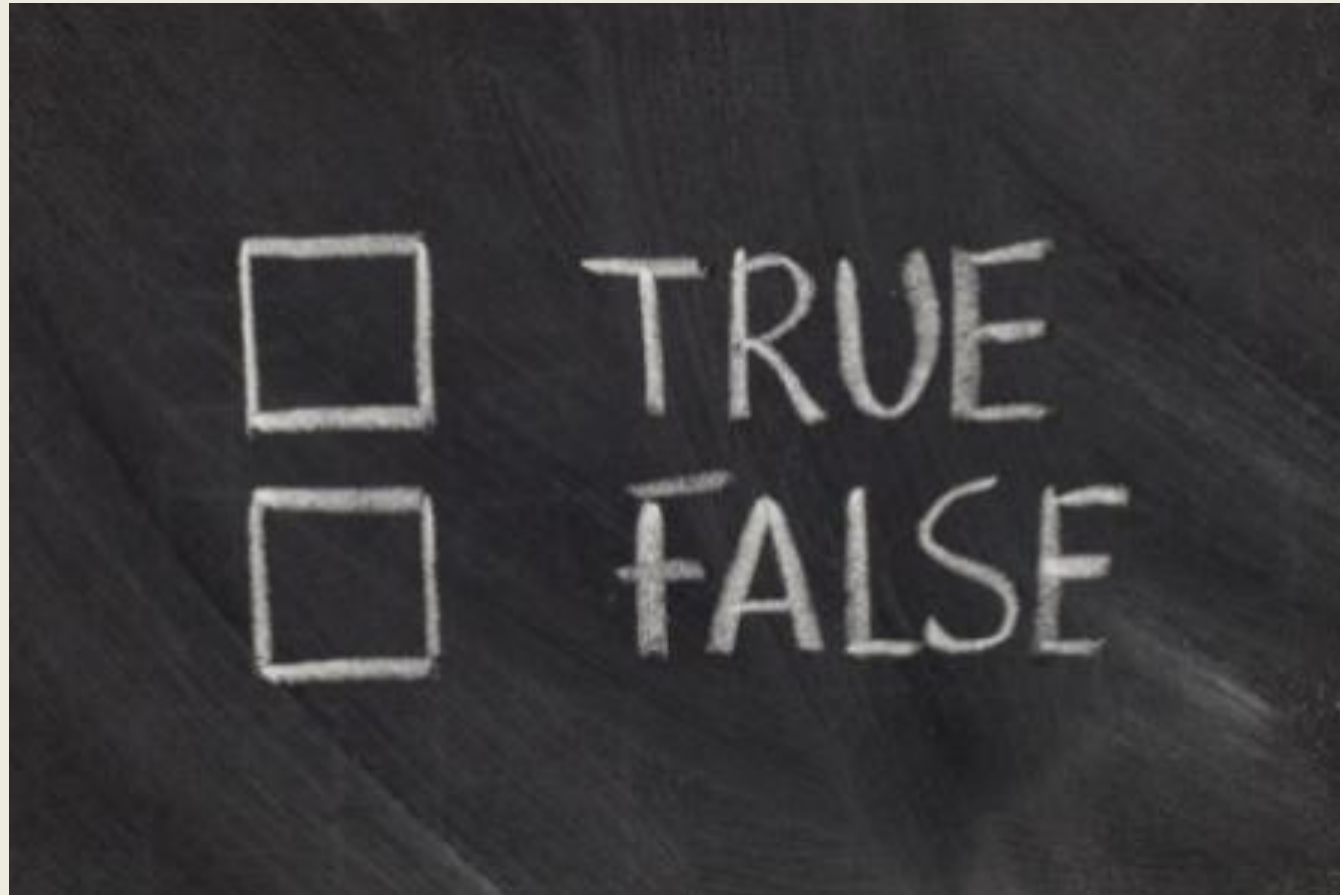
```
private void cow(int grass) {  
    println(grass) ;  
}
```

# Same Variable

```
private void run() {  
    int num = 5;  
    cow();  
}
```

```
private void cow() {  
    int num = 10;  
    println(num);  
}
```

# Boolean



# Boolean Variable

```
boolean karelIsAwesome = true;
```

```
boolean myBool = 1 < 2;
```



# Boolean Operations

```
boolean a = true;
```

```
boolean b = false;
```

```
boolean a_and_b = a && b;
```

```
boolean a_or_b = a || b;
```

```
boolean not_a = !a;
```

**Now that's style!**

